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(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Fruit Juice Concentrate in Chewing Gum

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ABSTRACT OF THE DISCLOSURE

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A chewing gum composition comprises from about 15% to about 85% by weight of a gum base material, from about 14% to about 60% by weight of a sweetening agent, and from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice. A method for formulating the novel chewing gum compositions of the invention is also disclosed.

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FRUIT JUICE CONCENTRATE IN CHEWING GUM

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to the use of fruit juices, and particularly concentrated fruit juices, as flavorants in chewing gum compositions.

2. Description of the Prior Art:

Most chewing gum compositions, including bubble gums, contain a generally water-insoluble gum base, water-soluble sweeteners that are either natural or artificial, and a flavoring agent that may be added in a variety of forms. Also, the gum may contain various additives such as plasticizers, softeners and bulking agents to improve the consistency and other qualitative properties of the gum.

A commonly noted deficiency in chewing gums has been the relatively rapid exhaustion of the flavor and sweetness sensation during chewing. This loss frequently occurs within the first three to five minutes of chewing.

Cold-pressed and concentrated natural essential oils, widely used as flavoring materials, are subject to flavor deterioration resulting from the action of heat, light, air and moisture. These essential oil flavors are known to oxidize when stored in the presence of air and moisture. During this deterioration process, terpene compounds, which have very unpleasant odors and tastes, are formed and the oxidized oils are therefore no longer satisfactory for use in flavoring.

Many attempts have been made to alleviate the aforementioned problems which are associated with chewing gum compositions which include natural essential oils as a flavoring agent. For example, U.S. Patent No. 2,060,461 provides a bubble gum composition which includes natural essential oils that have been pretreated to remove terpenes. Suitable natural essential oils are said to include peppermint, spearmint, wintergreen, birch, cassia, cloves, anise, ginger, lemon and orange.

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U.S. Patent No. 1,807,704 discloses a chewing gum formulation which includes 5% lemon juice, which is said to prevent crystallization of sugar within the composition. In addition to lemon juice, the formulation contains 50% mastic gum, 6% beeswax, 4% olive oil, and 35% sugar syrup.

U.S. Patent No. 4,513,012 discloses a center-filled chewing gum which may include flavor oils such as spearmint oil, cinnamon, oil of wintergreen (methylsalicylate), as well as artificial, natural or synthetic fruit flavors such as citrus oil, lemon, orange, grape, lime and grapefruit and fruit essences including apple, strawberry, cherry, and pineapple.

In spite of the above-mentioned efforts, it is generally agreed that no formulation and/or flavor is known which maintains fully a distinctive, natural taste characteristic in the oral cavity during the useful life of a chewing gum.

It has now been found that the chewing gum composition of this invention will provide superior flavor properties over prolonged periods of time, without the disadvantages characteristic of previously known products.

SUMMARY OF THE INVENTION

Applicant has unexpectedly discovered a chewing gum composition comprising from about 15% to about 85% by weight of a gum base material, from about 14% to about 60% by weight of a sweetening agent, and from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice.

In one preferred embodiment of the invention, it has been unexpectedly discovered to form a chewing gum composition which comprises from about 15% to about 85% by weight of a water-insoluble gum base material, from about 14% to about 60% by weight of a sweetening agent comprising sugar, and from about 1% to about 25% by weight of a flavoring agent comprising at least one concentrated fruit juice selected from the group consisting of natural fruit juices, natural and artificial flavors and mixtures thereof.

The invention also involves a method for preparing these novel chewing gum compositions.

In one preferred embodiment, a method for preparing a chewing gum composition comprises:

a) providing a mixture of from about 15% to about 85% by weight of a gum base material, from about 14% to about 60% by weight of a sweetening agent, and from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice;

b) forming a chewing gum composition from said mixture; and

c) recovering said chewing gum composition.

DESCRIPTION OF THE INVENTION

Applicant has unexpectedly discovered a novel chewing gum composition comprising:

a) from about 15% to about 85% by weight of a gum base material;

b) from about 14% to about 60% by weight of a sweetening agent; and

c) from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice.

Chewing gum compositions formed with the above-described chewing gum components yield a product which exhibits surprisingly good flavor characteristics.

The invention comprises a unique combination of three essential components, namely a gum base material, a sweetening agent, and a flavoring agent which comprises at least one concentrated fruit juice. In the absence of any one of these components from the formulations of this invention, compositions may be prepared which do not exhibit the enhanced effect achieved from this combination.

The gum base used in this invention may be any water-insoluble gum base well known in the art. Illustrative examples of suitable polymers in gum bases include both natural and synthetic elastomers and rubbers. For example,

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these polymers which are suitable in gum bases include, without limitation, substances of vegetable origin such as chicle, jelutong, balata, gutta-percha, lechi caspi, sorva, guayule rubber, crown gum and mixtures thereof. Synthetic elastomers such as butadiene-styrene copolymers, isobutylene-isoprene copolymers, polyethylene, polyisobutylene, polyvinylacetate and mixtures thereof, are particularly useful.

The amount of gum base employed will vary considerably depending on various factors such as the type of base used, consistency desired and other components used to make the final product. In general, amounts of about 5% to about 85% by weight of the final chewing gum composition are acceptable for use in the present invention, with preferred amounts of 15% to about 85% by weight.

The gum base composition may contain elastomer solvents to aid in softening the rubber component. Such elastomer solvents may comprise methyl, glycerol or pentaerythritol esters of rosins or modified rosins, such as hydrogenated, dimerized or polymerized rosins or mixtures thereof. Examples of elastomer solvents suitable for use herein include pentaerythritol ester or partially hydrogenated wood rosin or gum, pentaerythritol ester of wood rosin or gum, glycerol ester of polymerized rosin, glycerol ester of tall oil rosin, glycerol ester of wood rosin or gum and partially hydrogenated wood rosin or gum, and partially hydrogenated methyl ester or rosin and mixtures thereof. The solvent may be employed in an amount ranging from about 10% to about 75%, and preferably from about 45% to about 70%, by weight of the gum base.

A variety of traditional ingredients used as plasticizers or softeners such as lanolin, stearic acid, sodium stearate, potassium stearate, glyceryl triacetate, glycerin and the like, may be incorporated into the gum base to obtain a variety of desirable textures and consistency properties. These additional materials are generally employed in amounts of up to about 30% by weight and preferably in amounts of from

3% to about 7% by weight of the final gum base composition.

The chewing gum compositions of the present invention generally contain sweetening agents (sweeteners). The sweetening agent may be selected from a wide range of materials including water-soluble sweetening agents, water-soluble artificial sweeteners, water-soluble sweetening agents derived from naturally occurring water-soluble sweeteners, and additional amounts of dipetide based sweeteners, and protein based sweeteners, including mixtures thereof. Without being limited to particular sweeteners, representative illustrations encompass:

A. Water-soluble sweetening agents such as monosaccharides, disaccharides and polysaccharides such as xylose, ribose, glucose (dextrose), mannose, galactose, fructose (levulose), sucrose (sugar), maltose invert sugar (a mixture of fructose and glucose derived from sucrose), partially hydrolyzed starch, corn syrup solids, dihydrochalcones, monellin, steviosides, glycyrrhizin, and sugar alcohols such as sorbitol, xylitol, mannitol, maltitol, hydrogenated starch hydrolysate and mixtures thereof;

B. Water-soluble artificial sweeteners such as the soluble saccharin salts, i.e., sodium and calcium saccharin salts, cyclamate salts, acesulfame-K and the like, and the free acid form of saccharin;

C. Dipetide based sweeteners such as L-aspartyl-L-phenylalanine methyl ester and materials described in U.S. Patent No. 3,492,131, L-alpha-aspartyl-N-(2,2,4,4-tetramethyl-3-thietanyl)-D-alaninamide hydrate, and the like;

D. Water-soluble sweeteners derived from naturally occurring water-soluble sweeteners, such as chlorinated derivatives of ordinary sugar (sucrose), known for example under the product designation of sucralose; and

E. Protein based sweeteners such as thaumatin.

In general, the amount of sweetener employed will vary with the sweetener selected for a particular chewing gum

What is claimed is:

1. A chewing gum composition comprising:
 - a) from about 15% to about 85% by weight of a gum base material;
 - b) from about 14% to about 60% by weight of a sweetening agent; and
 - c) from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice.
2. The chewing gum composition of claim 1, wherein said flavoring agent further includes from about 0.2% to about 5% by weight of an artificial fruit flavor, based on the total weight of said chewing gum composition.
3. The chewing gum composition of claim 2, wherein said artificial fruit flavor is selected from the group consisting of orange, cherry, grape, strawberry, raspberry, lemon, lime, apple, pineapple, peach, apricot, banana, tangerine, blueberry, mango, papaya, grapefruit, pear and mixtures thereof.
4. The chewing gum composition of claim 1, wherein said concentrated fruit juice has a concentration of from about 30 to about 85 Brix.
5. The chewing gum composition of claim 4, wherein said concentrated fruit juice has a concentration of from about 40 to about 78 Brix.
6. The chewing gum composition of claim 5, wherein said concentrated fruit juice has a concentration of from about 60 to about 70 Brix.
7. The chewing gum composition of claim 1, wherein said sweetening agent is selected from the group consisting of water-soluble sweetening agents, water-soluble artificial sweeteners, and mixtures thereof.
8. The chewing gum composition of claim 6, wherein said sweetening agent is a sugar alcohol selected from the group consisting of xylitol, sorbitol, mannitol and mixtures thereof.

9. The chewing gum composition of claim 6, wherein said sweetening agent comprises sugar.

10. The chewing gum composition of claim 1, wherein said gum base comprises a natural or synthetic rubber.

11. The chewing gum composition of claim 10, wherein the natural or synthetic rubber is selected from the group consisting of chicle, jelutong, balata, gutta-percha, lechi caspi, sorva, guayule rubber, and mixtures thereof.

12. The chewing gum composition of claim 10, wherein said synthetic rubber is selected from the group consisting of butadiene-styrene copolymers, polyisobutylene, isobutylene-isoprene copolymers and mixtures thereof.

13. The chewing gum composition of claim 1, further including additional materials selected from the group consisting of plasticizers, softeners, fillers, emulsifiers, colors and mixtures thereof.

14. The chewing gum composition of claim 1, wherein said concentrated fruit juice comprises orange juice concentrate, cherry juice concentrate, grape juice concentrate, strawberry juice concentrate, raspberry juice concentrate, lemon juice concentrate, lime juice concentrate, apple juice concentrate, pineapple juice concentrate, peach juice concentrate, apricot juice concentrate, banana juice concentrate, tangerine juice concentrate, blueberry juice concentrate, mango juice concentrate, papaya juice concentrate, grapefruit juice concentrate, pear juice concentrate and mixtures thereof.

15. The chewing gum composition of claim 1, wherein said flavoring agent is present in amounts of from about 5% to about 15% by weight of the total chewing gum composition.

16. A chewing gum composition comprising:

a) from about 15% to about 85% by weight of a water-insoluble gum base material;

b) from about 14% to about 60% by weight of a sweetening agent comprising sugar;

c) from about 1% to about 25% by weight of a flavoring agent comprising at least one concentrated fruit

juice selected from the group consisting of natural fruit juices, natural and artificial flavors and mixtures thereof.

17. A method for preparing a chewing gum composition comprising:

a) providing a mixture of from about 15% to about 85% by weight of a gum base material, from about 14% to about 60% by weight of a sweetening agent, and from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice;

b) forming a chewing gum composition from said mixture; and

c) recovering said chewing gum composition.

18. The method of claim 17, wherein said flavoring agent further includes from about 0.2% to about 5% by weight of an artificial fruit flavor.

19. The method of claim 18, wherein said artificial fruit flavor is selected from the group consisting of artificial orange, cherry, grape, strawberry, raspberry, lemon, lime, apple, pineapple, peach, apricot, banana, tangerine, blueberry, mango, papaya, grapefruit, pear and mixtures thereof.

20. The method of claim 17, wherein said concentrated fruit juice has a concentration of from about 30 to about 85 Brix.

21. The method of claim 20, wherein said concentrated fruit juice has a concentration of from about 40 to about 78 Brix.

22. The method of claim 21, wherein said concentrated fruit juice has a concentration of from about 60 to about 70 Brix.

23. The method of claim 17, wherein said sweetening agent is selected from the group consisting of water-soluble sweetening agents, water-soluble artificial sweeteners, and mixtures thereof.

24. The method of claim 22, wherein said sweetening agent is a sugar alcohol selected from the group consisting of

xylitol, sorbitol, mannitol and mixtures thereof.

25. The method of claim 23, wherein said sweetening agent comprises sugar.

26. The method of claim 17, wherein said natural or synthetic rubber is selected from the group consisting of chicle, jelutong, balata, gutta-percha, lechi caspi, sorva, guayule rubber, and mixtures thereof.

27. The method of claim 17, wherein the synthetic rubber is selected from the group consisting of butadiene-styrene copolymers, polyisobutylene, isobutylene-isoprene copolymers and mixtures thereof.

28. The method of claim 17, wherein said mixture further includes additional materials selected from the group consisting of plasticizers, softeners, fillers, emulsifiers, colors and mixtures thereof.

29. The method of claim 17, wherein said concentrated fruit juice comprises orange juice concentrate, cherry juice concentrate, grape juice concentrate, strawberry juice concentrate, raspberry juice concentrate, lemon juice concentrate, lime juice concentrate, apple juice concentrate, pineapple juice concentrate, peach juice concentrate, apricot juice concentrate, banana juice concentrate, tangerine juice concentrate, blueberry juice concentrate, mango juice concentrate, papaya juice concentrate, grapefruit juice concentrate, pear juice concentrate and mixtures thereof.

30. The method of claim 17, wherein said flavoring agent is present in amounts of from about 5% to about 15% by weight of the total chewing gum composition.

31. A method for preparing a chewing gum composition comprising:

a) providing a mixture of from about 15% to about 85% by weight of a water-insoluble gum base material, from about 14% to about 60% by weight of a sweetening agent comprising sugar, and from about 1% to about 25% by weight of a flavoring agent comprising at least one concentrated fruit juice selected from the group consisting of natural fruit

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comprising sugar, and from about 1% to about 25% by weight of a flavoring agent comprising at least one concentrated fruit juice selected from the group consisting of natural fruit juices, natural and artificial flavors and mixtures thereof;

b) forming a chewing gum composition from said mixture; and

c) recovering said chewing gum composition.

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composition. Thus, for any given sweetener a sufficient amount of sweetener is used to provide the end result desired. For example, an effective amount of sweetener is utilized to provide the level of sweetness desired. This amount will normally be 0.01% to about 90% by weight when using an easily extractable sweetener. The water-soluble sweeteners described in category A above, are usually used in amounts of about 14% to about 60% by weight, and preferably in amounts of about 45% to about 55% by weight of the final chewing gum composition. Some of the sweeteners in category A (e.g., glycyrrhizin) may be used in amounts set forth for categories B-E below due to the sweeteners known sweetening ability. In contrast, the additional artificial sweeteners described in categories B-E are used in amounts of about 0.005% to about 5.0% and most preferably about 0.05% to about 2.5% by weight of the final chewing gum composition. These amounts are ordinarily necessary to achieve a desired level of sweetness independent from the flavor level achieved from the flavoring agents.

The flavoring agents provided in accordance with the present invention comprise at least one concentrated fruit juice which may be selected from a variety of fruit juice concentrates, including orange juice concentrate, cherry juice concentrate, grape juice concentrate, strawberry juice concentrate, raspberry juice concentrate, lemon juice concentrate, lime juice concentrate, apple juice concentrate, pineapple juice concentrate, peach juice concentrate, apricot juice concentrate, banana juice concentrate, tangerine juice concentrate, blueberry juice concentrate, mango juice concentrate, papaya juice concentrate, grapefruit juice concentrate, pear juice concentrate and mixtures thereof.

The flavoring agents of the invention comprise from about 1% to about 25%, and preferably comprise from about 5% to about 15% by weight of the total chewing gum composition. Fifteen percent juice concentrate may be said to be equivalent to approximately 55% to 75% juice in the final chewing gum composition.

flavoring agents of the invention comprise at least one concentrated fruit juice, the fruit juice concentrate having a concentration of from about 30 to about 85 Brix, preferably from about 40 to about 78 Brix, and most preferably from about 60 to about 70 Brix.

The concentrated fruit juices may be used as the sole flavorants in the chewing gum compositions of the present invention, or artificial-type flavoring agents may optionally be added to the fruit juice concentrate based flavoring agents, preferably in an amount of from about 0.2% to about 5% by weight of the total chewing gum composition. The optional addition of natural essential oils to the concentrated fruit juice-based flavoring agents of the invention is also contemplated.

Among the optional artificial flavor additives which are useful in the chewing gum compositions of the present invention are those selected from the group consisting of artificial orange, cherry, grape, strawberry, raspberry, lemon, lime, apple, pineapple, peach, apricot, banana, tangerine, blueberry, mango, papaya, grapefruit, pear and mixtures thereof.

The chewing gum compositions of the invention may additionally include the conventional additives of coloring agents such as titanium dioxide; emulsifiers such as lecithin and glyceryl monostearate; and additional fillers such as aluminum hydroxide, alumina, aluminum silicates, calcium carbonate, talc and combinations thereof. These fillers may also be used in the gum base in various amounts. Preferably the amounts of fillers when used will vary from 4% to about 30% by weight of the final chewing gum product.

In another aspect of the invention, it has been unexpectedly discovered to form a chewing gum composition comprising:

- a) from about 15% to about 85% by weight of a water-insoluble gum base material;
- b) from about 14% to about 60% by weight of a sweetening

insoluble gum base material;

b) from about 14% to about 60% by weight of a sweetening agent comprising sugar;

c) from about 1% to about 25% by weight of a flavoring agent comprising at least one concentrated fruit juice selected from the group consisting of natural fruit juices, natural and artificial flavors and mixtures thereof.

The invention also contemplates a method for preparing a chewing gum composition comprising:

a) providing a mixture of from about 15% to about 85% by weight of a gum base material, from about 14% to about 60% by weight of a sweetening agent, and from about 1% to about 25% by weight of a flavoring agent which comprises at least one concentrated fruit juice;

b) forming a chewing gum composition from said mixture; and

c) recovering said chewing gum composition.

The means for mixing the gum base material, sweetening agent and flavoring agent are conventionally known to those skilled in the art. A particular advantage of the present invention is that no special adjustment of manufacturing procedures are necessary in order to produce the novel chewing gum compositions of the present invention.

In another aspect of the invention, a method for preparing a chewing gum composition comprises:

a) providing a mixture of from about 15% to about 85% by weight of a water-insoluble gum base material, from about 14% to about 60% by weight of a sweetening agent comprising sugar, and from about 1% to about 25% by weight of a flavoring agent comprising at least one concentrated fruit juice selected from the group consisting of natural fruit juices, natural and artificial flavors and mixtures thereof;

b) forming a chewing gum composition from said mixture; and

c) recovering said chewing gum composition.

The chewing gum compositions made from the instant

process may be of the sugar or sugarless variety and may be formulated into regular or non-adhering chewing gum pieces. Bubble gum, stick gum, pillow shaped, chunk, coated, and other gum piece forms well known to the art are contemplated. If a sugarless gum is desired, then the fruit juice may be of the sour citrus variety with no or negligible sugar content, e.g., lemon and lime.

A suitable process for preparing the chewing gum compositions of the present invention comprises adding to a suitable gum kettle a melted blend of gum base and corn syrup and mixing until homogenous. Usually a homogenous mass is obtained in about six minutes at a temperature of about 55° to about 65°C. Sugar, or other suitable sweeteners, and color are then blended into the homogenous mass for approximately two minutes. The flavoring agent is then added to the composition and mixed until sufficiently homogeneous.

The following examples are given to illustrate the invention, but are not deemed to be limiting thereof. All percentages given throughout the specification are based upon the weight of the final chewing gum composition unless otherwise indicated.

EXAMPLE 1Preparation of a Chewing Gum Composition

A chewing gum composition was prepared from the following ingredients:

<u>Ingredient</u>	<u>Percent</u> <u>w/w</u>
Gum Base	22.0
Sweetening Agent	56.6
Corn Syrup	10.0
Orange Juice Concentrate	10.0
Citric Acid	1.2
Color	0.2

When subjected to a test panel evaluation, it was found that the chewing gum composition prepared according to the formulation of this example had a pleasant fruit juice taste with good texture, although the sample would be improved with added flavor or essence.

EXAMPLE 2Preparation of a Chewing Gum Composition

A chewing gum composition was prepared from the following ingredients:

<u>Ingredient</u>	Percent
	<u>w/w</u>
Gum Base	22.0
Sweetening Agent	55.6
Corn Syrup	6.0
Orange Juice Concentrate	15.0
Citric Acid	1.2
Color	0.2

When tested according to Example 1, the chewing gum composition prepared according to this example had a pleasant fruit juice taste with good texture, and had a stronger flavor than the composition from Example 1. There was no need to add additional flavor or essence to the composition of this example.

EXAMPLE 3Preparation of a Chewing Gum Composition

A chewing gum composition was prepared from the following ingredients:

<u>Ingredient</u>	<u>Percent</u> <u>w/w</u>
Gum Base	22.8
Sweetening Agent	61.4
Corn Syrup	12.0
Cherry Juice Concentrate	2.0
Artificial Fruit Punch Flavor	0.9
Citric Acid	0.7
Color	0.2

When tested according to Example 1, the chewing gum composition prepared according to this example had a pleasant taste and good texture. The use of artificial fruit flavor in conjunction with the fruit juice concentrate flavorant was necessary because the lower amount of fruit juice concentrate did not suffice as the sole flavorant in the composition.

EXAMPLE 4Preparation of a Chewing Gum Composition

A chewing gum composition was prepared from the following ingredients:

<u>Ingredient</u>	<u>Percent</u> <u>w/w</u>
Gum Base	22.8
Sweetening Agent	61.4
Corn Syrup	12.0
*Multi-juice Concentrate	2.0
Artificial Fruit Flavor	0.9
Citric Acid	0.7
Color	0.2

*Cherry, Orange and Pineapple

When tested according to Example 1, the chewing gum composition prepared according to the above example had a pleasant taste and good texture. The use of a multi-juice concentrate in conjunction with the fruit juice concentrate was necessary because the lower amount of juice concentrate was insufficient as the sole flavorant in the composition.

EXAMPLE 5

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Preparation of a Chewing Gum Composition

A chewing gum composition was prepared from the following ingredients:

<u>Ingredient</u>	Percent
	<u>W/W</u>
Gum Base	22.8
Sweetening Agent	61.4
Corn Syrup	12.0
*Mixed Juice Concentrate	2.0
Artificial Fruit Flavor	0.9
Citric Acid	0.7
Color	0.2

*Cherry and Apple

When tested according to Example 1, the chewing gum composition prepared according to the above example had a pleasant taste and good texture. Again, the use of the artificial flavor in conjunction with the fruit juice concentrate was necessary because the lower amount of juice concentrate was insufficient as the sole flavorant in the composition.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention and all such modifications are intended to be included within the scope of the following claims.

EXAMPLE 5Preparation of a Chewing Gum Composition

A chewing gum composition was prepared from the following ingredients:

<u>Ingredient</u>	Percent
	<u>w/w</u>
Gum Base	22.8
Sweetening Agent	61.4
Corn Syrup	12.0
*Mixed Juice Concentrate	2.0
Artificial Fruit Flavor	0.9
Citric Acid	0.7
Color	0.2

*Cherry and Apple

When tested according to Example 1, the chewing gum composition prepared according to the above example had a pleasant taste and good texture. Again, the use of the artificial flavor in conjunction with the fruit juice concentrate was necessary because the lower amount of juice concentrate was insufficient as the sole flavorant in the composition.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention and all such modifications are intended to be included within the scope of the following claims.